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## ABSTRACT:

PURPOSE: To improve the operability for communication connection by dynamically changing and displaying functions of plural communication control icons corresponding to cooperative work forms on a terminal and connecting a line with a communication medium corresponding to a selected function.

CONSTITUTION: In the case of tripartite cooperative work, an entry button 360 used to give a command to a specific other party is displayed on a panel window 300 for work of a work station 20 besides icons 310 to 340 of telephone, video conference, conference, and address book. Classifications of communication mediums (data system, video system, and audio system) connecting the entries are displayed in display areas 370-A and 370-B. When a communication line of the video system to a station, to which a medium of the video system is not connected, will be newly established, an entry button 360-B is selected after the video telephone icon 320 is selected, and then, a line connection control routine indicated by the video telephone icon 320 automatically connects a communication line of the video system.

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MULTI-MEDIA TERMINAL DEVICE AND  
COMMUNICATIONS CONNECTION CONTROL FORMAT  
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(54) Title of the Invention: MULTI-MEDIA TERMINAL DEVICE  
AND COMMUNICATIONS  
CONNECTION CONTROL FORMAT

(57) Summary

Objective: The objective of the present invention is to improve the operative efficiency of a user's communications connection access with regard to a joint operative system constituted by multiple work stations.

Constitution: Multi-media communications connection icons (310) through (330), the functions of which are designated to vary depending on the current connection statuses of communications media in correspondence to the respective terminal devices (participants) engaging in a joint operation, are configured, and upon the selection of any of these icons, the control program (680) ensures multi-media communications connection modalities optimally suited for the current status.

Effects: Connection operations for multi-media communications paths can be significantly simplified.

#### Claims

1. A multi-media communications connection control format with the following characteristics: In a communications system which consists of multiple terminal devices endowed each with a window function, multiple communications control icons which correspond to the modes of joint operations which are to be

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<sup>1</sup>Numbers in the margin indicate pagination in the foreign text.

executed via said terminal device are displayed on a singular window generated on the screen of each terminal device, whereas the functions of these communications control icons are dynamically redesignated in accordance with the functions of selected communications control icons, whereas [said respective terminals are mutually] connected via communications media which accord with the functions of said selected communications control icons.

2. The multi-media communications connection control format specified in Claim 1 wherein the functions of said communications control icons are redesignated in accordance with terminal devices which serve as connected nodes.

3. The multi-media communications connection control format specified in Claim 1 or 2 wherein, in a case where terminal devices which serve as connected nodes have been designated, the addresses of the terminal devices of said nodes are memorized, and wherein, in a case where any of the aforementioned communications control icons is subsequently selected in relation to said node terminal devices, the respective node terminal devices are connected via communications media specified by the functions of said icons.

4. The multi-media communications connection control format specified in Claim 1, 2, or 3 wherein node display icons which correspond to terminal devices which serve as connection nodes are displayed on the screen of each of said terminal devices and wherein node terminal devices and

communications media which are to be subjected to connection control routines are designated by selecting respectively proper ones from among the aforementioned node display icons and communications control icons.

5. The multi-media communications connection control format specified in Claim 1, 2, or 3 wherein a window for displaying said communications control icons in correspondence to the terminal devices which serve as connection nodes is displayed on the screen of each of said respective terminal devices and wherein, in a case where any of said communications control icons has been selected, node terminal devices corresponding to the window in which the selected icon is being positioned are mutually connected via communications media specified by the function of said selected communications control icon.

6. A multi-media communications connection control format with the following characteristics: In a communications system which consists of multiple terminal devices endowed each with a window function, multiple types of communications control icons which have been prepared for the connection control of one or mutually different multiple types of communications media are displayed on-screen, whereas the communications media connection control modes to be executed in correspondence to said respective communications connection control icons are dynamically redesignated, whereas, in a case where any of said communications connection control icon has

been selected, [a given terminal device is] connected to [an] other terminal device(s) via communications media specified by the function of said icon.

7. A multi-media terminal device with the following characteristics: In a multi-media terminal device which is connected with at least one other terminal device via a network, a mechanism which displays multiple types of communications connection control icons which have been prepared for connection control purposes via one or mutually different multiple types of communications media on-screen, an icon function control mechanism which dynamically redesignates the communications media connection control routines to be executed in correspondence to said respective communications connection control icons, and an icon selection mechanism are configured while it is being connected to said another terminal device(s) via the communications media which have been specified by the functions of the communications connection control icons which have been selected by said selection mechanism.

8. The multi-media terminal device specified in Claim 7 wherein said icon function control mechanism redesignates the functions of said communications control icons in correspondence to the terminal devices which serve as connection nodes.

9. The multi-media terminal device specified in Claim 7 or 8 which additionally possesses a mechanism which, in a case



where a terminal device(s) which serves as a connection node(s) has been selected, memorizes the address(es) of said terminal device(s) and wherein, in a case where any of said communications control icons is subsequently selected in relation to said node terminal device(s), a connection with said node terminal device is established via the communications media which have been specified by the function of said icon with reference to the address(es) memorized in said mechanism.

10. The multi-media terminal device specified in Claim 7, 8 or 9 wherein said icon display mechanism displays a node display icon which corresponds to the terminal device which serves as a connection node and wherein a node terminal device(s) which is to be subjected to the connection control routine and communications media are designated by selecting said node display icon and said communications control icon.

11. The multi-media terminal device specified in Claim 7, 8 or 9 wherein said icon display mechanism generates a window for displaying said communications control icon corresponding to the terminal device(s) which serves as a connection node(s) and wherein, in a case where a communications control icon has been selected, connection is established with the node terminal device which corresponds to the window in which said icon is being displayed via the communications media which have been specified by the function of said selected communications control icon.

## Detailed explanation of the invention

[0001]

(Industrial application fields of the invention)

The present invention concerns a multi-media terminal device as well as a communications connection format. More specifically, it concerns a terminal device to be used for a multi-media communications system wherein multiple terminal devices (or work stations) are mutually connected via a multi-media communications path and wherein multiple users which are physically apart can engage in conferences, planning meetings, operations for jointly compiling data, etc. by using commonly shared data, animate images of the other party, or voices which are displayed on their respective terminal screens as well as a corresponding communications media connection control format.

[0002]

(Prior art of the invention)

As far as multiple-site conference systems which are convened by multiple users who communicate with one another via conference screens which have been formed on terminals or work stations which are mutually connected via communications lines are concerned, many formats for connecting the respective terminals and modalities for transmitting and receiving data have been proposed. Japanese Patent Application Publication No. Kokai Hei 3[1991]-157044, for example, proposes a format wherein the number of television

conference participants (i.e., number of terminals) can be arbitrarily enlarged. Japanese Patent Application Publication No. Kokai Sho 63[1988]-1140, furthermore, proposes a format for simultaneously controlling voice lines and data lines for the purpose of improving the call transmission and cut-off operative efficiencies of composite terminals which communicate with one another via telephone lines and data lines.

[0003]

(Problems to be solved by the invention)

The aforementioned proposals are intended to improve the operative efficiencies of line connection control protocols in cases where multiple participants engage in electronic joint operations via terminals. The objects of connection control, however, are limited to telephone machines and computer terminals, and therefore, they fail to provide a flexible communications media connection control format which can be applied to general-purpose multi-media communications purposes which involve other communications media.

[0004]

One objective of the present invention is to provide a terminal device which can be effectively applied to an electronic conversation system or joint operation system wherein multiple terminal devices are mutually connected via a multi-media communications path as well as a corresponding communications connection control format.

[0005]

Another objective of the present invention is to provide a terminal device, electronic conversation system, or a joint operation system the device functions of which can be dynamically redesignated in accordance with the communications status variations of the communications media.

[0006]

Still another objective of the present invention is to provide a communications connection control format which facilitates communications media switch operations by users.

[0007]

(Problems to be solved by the invention)

The following constitution is provided by the multi-media terminal device and communications connection control format of the present invention in order to achieve the aforementioned objectives: In a communications system which consists of multiple terminal devices endowed each with a window function, multiple communications control icons which correspond to the modes of joint operations which are to be executed via said terminal device are displayed on a singular window generated on the screen of each terminal device, whereas the functions of these communications control icons are dynamically redesignated in accordance with the functions of selected communications control icons, whereas [said respective terminals are mutually] connected via communications media which accord with the functions of said

selected communications control icons. The modalities of the "joint operation" as it is being hereby referred to signify operation modalities which utilize different communications media (e.g., telephone conversation, TV telephone conversation with reference to video images, electronic conversations which utilize telephone and data processing outputs, conversations which simultaneously utilize TV telephones and data processing outputs, etc.).

[0008]

As far as another aspect of the present invention is concerned, multiple types of communications control icons which have been prepared for the connection control of one or mutually different multiple types of communications media are displayed on the respective terminal devices while the functions of these icons are being dynamically redesignated for the purpose of controlling the connections among multiple terminal devices (or work stations). The aforementioned icon functions may, for example, be redesignated by using an icon functional status control mechanism in which communications media connection control protocols to be executed in response to the selections of the respective communications connection control icons have been defined. In a desirable application example of the present invention, the aforementioned icon functions can be redesignated in accordance with connection node devices.

[0009]

As far as still another aspect of the present invention is concerned, in a case where a connection node has become designated, the address information on the node device is memorized, and in a case where a command for altering the communications media connection modalities vis-a-vis said node device is subsequently issued, the communications path communications control routine is executed by using the previously memorized address information instead of having to redesignate the address of the connection node on the part of the user.

[0010]

(Functions)

As far as the present invention is concerned, a given icon is endowed with different functions depending on the communications media connection statuses vis-a-vis node devices at the time of operation. In a case where a control icon which uses multiple types of communications media A and B has been selected, for example, the communications media connection control protocols which are executed in response to icon operations come to differ mutually between a case where said control icon has been selected in a state where [the device which has selected said icon has] already been connected to the node device via the medium A and a case where said control icon has been selected in an utterly unconnected state. In the former case, the aforementioned control icon serves the function of a connection command icon for one

medium B, whereas in the latter case, the aforementioned control icon serves as a connection command icon for both media A and B.

[0011]

As far as the present invention is concerned, in a case where it has become necessary for users to redesignate the types of communications media to be connected to the node devices or their connection modalities in the context of altering the types or scales of conferences or joint operations, a control icon which expresses the preferred operation mode to be executed in relation to the node device is designated, based on which a desired communications environment can be established. In comparison with a format of the prior art wherein communications connection control icons endowed with fixed functions which have been configured in correspondence to communications media are operated and wherein multiple types of communications media which are necessary for the objective conferences or joint operations are individually connected in a controlled state, therefore, cumbersome repetitious routines can be eradicated, and the operations can be simplified, based on which flexible responses can be rendered in response to changes in the number of participants (number of terminals) of conferences or joint operations or to other environmental changes.

(Application examples)

[0012]

Figure 1 shows an electronic conversation system which consists of three work stations (40) (40-A, 40-B, and 40-C), which are mutually coupled via the communications network (30), which may, for example, be instantiated by a LAN (local area network) or ISDN (integrated services digital network), etc. Each work station (40) is endowed with a multi-window function, and a window for displaying conference data to be used for the joint operation or electronic conversation is generated on each display screen (20) (20-A, 20-B, or 20-C). Each work station (40), furthermore, is endowed with the telephone machine (10) (10-A, 10-B, or 10-C), which complements the progress of a conference which is being monitored with reference to the display screen with audio means.

[0013]

Figure 2 is a block diagram which shows the fundamental constitution of the work station (40). In said figure, (140) is a memory device in which various programs and data are stored, whereas (90) is a central processing unit (CPU) which executes data processing routines in compliance with program commands decoded from the aforementioned memory device (140), whereas (100) is a bit map processor (BMP) which encodes contents to be outputted to the display screen (130) as image data in compliance with the command of the aforementioned CPU (90). The contents of the frame memory (110) are decoded by the display controller (120) and then

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displayed on the display screen (output device) (130).

[0014]

(180-A) is a keyboard, which represents one of the input devices (180), whereas (160) is a keyboard driver (160) [sic: Duplication] which stores the code data inputted via said keyboard into the register (150-A), whereas (180-B) is a mouse, which represents another of the input devices (180), whereas (170) is a mouse driver (170) [sic: Duplication] which stores the code data inputted via said mouse into the register (150-B).

[0015]

Each work station (40) is connected to the communications network (30), which is constituted by a LAN, ISDN, etc. via the communications interface device (80). Incidentally, in a case where the ISDN is used as the communications network (30), the output of the telephone machine (10) is outputted to the communications network (30) via the communications interface device (80). In this application example, the telephone machine (10) can be initialized by the CPU (90).

[0016]

Figure 3 shows one example of the operation panel window (300), which is displayed on the display screen (20) of the display (130) of each work station for controlling the multi-media communications connection. Three types of icons, namely the telephone icon (310), TV telephone icon (320), and the conference icon (330), are prepared for the aforementioned

operation panel window (300) as communications control icons, and the address book icon (340) is additionally prepared for it for designating connection nodes. In this example, a state where the address book window (350) has been opened on the display screen by the user's selection of the address book icon (340) is shown.

[0017]

In a case where a joint operation is initialized anew, confirmation telephone calls are first placed to other participants. In this case, the mouse (180-B) is operated for selecting the telephone icon (310) on the operation panel window (300) first and for subsequently selecting the address book icon (340), followed by the display of the address book window (350). This selection order, however, may also be reversed.

[0018]

The address book window (350) includes a comprehensive list of members which can be called upon to participate in the joint operation, and in a case where a user selects the names of prospective participant members from the aforementioned comprehensive list via the mouse (180-B), preliminarily memorized telephone numbers are first dialed automatically, as a result of which calls arrive at the members. The connection of the voice line is completed upon the pickup of the call recipient's receiver. In this case, the terminal addresses of the members who have been selected on the address book window

(350) are automatically memorized as joint operation participants, and in a case where connection control routines for other media (data and video images) are subsequently executed in relation to the aforementioned participant members, there is no need to redesignates the same members once again on the address book window (350). The aforementioned address book icon (340) is also utilized according to procedures identical to the aforementioned one in a case where new members are added to the environment of a joint operation which has already begun.

video  
images

[0019]

Instead of being placed within the special operation window (300), the telephone icon (310), TV telephone icon (320), and conference icon (330) may also be configured within the window (420-A), which is used for individual operations (local operations), which will be discussed later with reference to Figure 6. The attributes of these icons are managed by the icon status management table (500), as will be discussed later with reference to Figure 7. The functions of these icons vary in accordance with adventitiously achieved statuses.

[0020]

Figure 4 shows one example of the display screen of the display screen (20) of a case where three members participate in a joint operation. In addition to the telephone icon (310), TV telephone icon (320), conference icon (330), and

address book icon (340), which have been shown with reference to Figure 3, as well as the participant buttons (360) (360-A and (360-B) are hereby displayed.

[0021]

In a case where the joint operation is performed by two participants (i.e., pervasion of only one other node), only one address needs to be memorized, whereas in a case where two or more other nodes exist, two or more addresses must be correspondingly memorized. In a case where a command is issued in relation specifically to one of multiple other participants, the node in question is specified by using said participant buttons (360).

[0022]

The display areas (370) (370-A and 370-B), which show the types of communications media through which the stations of the participants indicated by the respective buttons are connected to ones' own selection, are configured in the vicinity of the aforementioned participant buttons (360). In the case of the example shown in the figure, three types of communications media, namely the data system ("D"), sound system ("V"), and video system ("S") [sic: "V" and "S" should presumably be swapped], are connected to the station of the participant "Shimazaki" (360-A), whereas two types of communications media, namely the data system and sound system, are connected to the station of the participant "Kobayashi."

[0023]

In the context of coordinating or communally sharing the application programs (APs) of the "datum 1," which is indicated by the icon (400-A), and the "datum 2," which is indicated by the icon (400-B), on the conference room window (390), the data communications media enable the communications of input commands or data related to these APs among the respective stations. The sound communications medium promotes an unhindered joint operation by communicating the sound signals to the respective stations via telephone machines. The video image communications medium transmits the images of users' faces which have been picked up by TV cameras auxiliarily attached to the respective stations to other stations in such a way that the facial expressions of other participants can be mutually observed while being displayed, for example, on the TV telephone window (380). In the aforementioned example, the conference room window (390) is shared by three members, namely "Shimazaki," "Kobayashi," and oneself. No video image medium, however, is connected with the participant "Kobayashi," and therefore, no TV telephone window for the participant "Kobayashi" is opened on the screen. In a case where one wishes to display the facial image of the participant "Kobayashi" in this state, namely in a case where one wishes to establish a communications line of the video image medium in relation to the "Kobayashi" station, the TV telephone icon (320) is selected on the operation panel window (300), and the participant button (360-B), which

(camera)

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corresponds to the participant "Kobayashi," is subsequently selected. As an alternative mode of operation, furthermore, the communications network (30) may be picked and then moved onto the participant button (360-B) for "Kobayashi." A line connection control routine indicated by the TV telephone icon (320) automatically establishes a video image communications line vis-a-vis the station of the participant "Kobayashi" in response to these operations. X

[0024]

Figure 5 shows one example of the display screen of the display screen (20) in a case where one engages in a joint operation with two other participants, as Figure 4 indicates. The participant statuses and participant-specific communications media statuses are identical to their counterparts in Figure 4.

[0025]

A case where the operation panel windows (410) (410-B and 410-C) are configured for the respective participants is hereby shown as a modified example of the operation panel window (300) pertaining to the case of Figure 4. The participant buttons (360) can be dispensed with by thus configuring participant-specific operation panel windows (410) and by memorizing the device addresses of the corresponding participants into the respective panel windows. In other words, in a case where the telephone icon (310), TV telephone icon (320), and the conference icon (330) are selected on the

operation panel windows (410) (410B or 410C), the node device addresses corresponding to the respective panel windows can be procured.

[0026]

As far as the aforementioned format wherein participant-specific operation panel windows are configured is concerned, the operation panel window (410-A), which serves as a master, is preliminarily prepared, and a new participant is designated by operating this master panel window, and the participant-specific operation panel window (410), which corresponds to said participant, is thus generated. There is no need to configure the address book icon (340) on the participant-specific operation panel window (410), and it needs to be configured only on the master panel window (410-A) or individual operation window (420). The designation of the new member is executed by generating the address book window (350) by operating the aforementioned address book icon (340) and by designating the objective participant on its comprehensive list.

[0027]

Only one operation panel window (300) suffices for the format shown in Figure 4 regardless of the number of participants, based on which the number of windows to be displayed on-screen for the joint operation can be minimized. In this respect, the format shown in Figure 5 may be said to be problematic in that the number of windows to be displayed

on-screen increases as the number of participants increases, although it is conversely advantageous in that an operation for designating a prospective participant(s) via the participant button (360) upon each redesignation of the communications media modes can be dispensed with. As far as actual applications are concerned, it is also feasible for a user to select either of the aforementioned two formats.

[0028]

Figure 6 shows one example of the display screen (20) on which the connection request confirmation window (430) has been generated. The connection request confirmation window (430) may, for example, be generated for establishing a connection upon the approval of the user who has received the request in a case where a connection request for communications media other than the sound system has been received from a node station, as in the case of a conference room connection request, for example. In other words, an inconvenient uninvited arising of a joint operation environment (e.g., conference room window (390), etc.) on the screen (20) of the work station as a result of an operation of the other party while a user engages in a data processing routine via the individual operation windows (420-A) and (420-B) may be avoided by the preliminary output of the inquiry message (440) for the user into the connection request confirmation window (430) and by selecting the "YES" button (450) in a case where the user can accept the connection of



the conference room [window] (390) or by selecting the "NO" button (460) in a case where the user wishes to decline the connection request. In a case where preliminary agreements have been obtained via telephone connections, etc., furthermore, the display of the connection request conformation window (430) may also be inhibited [sic: Presumably "disabled"] for further simplifying the operation. [0029]

Figure 7 shows the icon functional status table (500), which serves a function of managing the statuses of the media icons (i.e., telephone icon (310), TV telephone icon (320), and conference icon (330)) on the operation panel window (300). One example of set of standard setting designations at the initial stage is indicated by the table shown in the figure.

[0030]

The communications media (502) which must be connected or established upon the selections of their respective icons are defined in correspondence to the media icon names (504). In a case where the telephone icon (310) has been selected at the initial stage, for example, only the sound system is characterized by the "ON" status, and accordingly, the sound system alone becomes connected. In a case where the TV telephone icon (320) has been selected, both the sound and video image systems, which are characterized by their respective "ON" statuses, become connected, whereas in a case

where the conference icon (330) has been selected, all the sound, video image, and data systems, which are characterized by their respective "ON" statuses, become connected.

[0031]

The aforementioned icon functional status table (500) is configured for each participant, namely for the connection node address. In the case of Figure 4, the table (500) is configured for each participant button (360) on the operation panel window (300), whereas in the case of Figure 5, the table (500) is configured for each participant-specific operation panel window.

[0032]

The designated functions of the aforementioned icon functional status table (500) become updated from its initial settings on every media icon selection occasion. After the telephone icon (310) has already been selected, for example, the sound system is already connected, and therefore, the status of the icon functional status table (500) varies according to Figure 8. Incidentally, the designation contents of the table initial settings can be altered by users' operations.

[0033]

Figure 8 shows the icon functional status table (500'), which has come to prevail as a result of the status change of the icon functional status table (500) as a result of the selection of the telephone icon (310). Sound systems are

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already connected to the respective participants corresponding to the icon functional status table via telephone icons, and therefore, the sound system of the communications media becomes characterized by an "OFF" status in relation to each of the telephone icon (310), TV telephone icon (320), and conference icon (330) on the updated icon functional status table (500'). In a case where an operation for connecting the communications path with the participants corresponding to the table (500') is carried out anew by using these icons, therefore, [sic: No predicate] ... in a case where the TV telephone icon (320) is used, for example, the video image system alone becomes connected while the sound system is being excluded.

[0034]

Figures 9 through 13 show medium-specific logic communications path connection modalities among participants. The logic communications path connection modality of the sound system (540) upon the selection of the telephone icon (310) on the operation panel window (300) with regard to two members, namely the participants (A510) and (B520), is shown in Figure 9. In a case where the logic communications path for the sound system (540) becomes connected, connection standby statuses vis-a-vis the data system (550) and the video image system (560) are assumed by the respective sites in preparation for the next connection command.

[0035]

Figure 10 shows a state where the data system (550) and video image system (560) have been further connected based on the selection of the conference icon (330) on the operation panel window (300) in the sound system connection state shown in Figure 9.

[0036]

Figure 11 shows a state where the state where the two participants, namely (A510) and (B520), are connected via the sound, data, and video image systems is expanded into a three member connection state where the participant (C530) has been added anew. An operation for the participant (A510) to select the telephone icon (310) on the operation panel window (300) and a node selection operation on the address book window (350) are hereby carried out in the context of calling the new participant (C530), and a case where the cyclic sound system (540) connection configuration has been achieved among the three participants as a result of the reception of the telephone call by the participant (C530) is hereby shown. In a case where the sound system connection is thus established, the participant (C530) assumes a communications path standby status. The data system (550) and video image system (560) still remain connected with only two participants, namely (A510) and (B520), at this stage.

[0037]

Figure 12 shows a state where the data system (550) and video image system (560) have been connected to the

participant (C530) as a result of the operation of the conference icon (330) by the participant (A510) shown in Figure 11. The participant (A510) engages in an operation for connecting the data system and video image system anew to the participant (C530), who is standing by for connection paths, and subsequently, the communications paths of the data system (550) and video image system (560) to the participant (B520) are severed. The participant (B520) assumes a standby status awaiting the next connection as soon as these communications paths become severed. The participant (C530) is notified of the address of the participant (B520), and it is commanded to connect the communications path to the participant (B520).

[0038]

Figure 13 shows a state where the participant (C530), who has received the command from the participant (A510), has connected the data system (550) and video image system (560) to the participant (B520), who has been standing by for new communications paths shown in Figure 12. As the figure indicates, a logic communications path of the sound system (540), data system (550), and the video image system (560) becomes formed in a cyclic fashion among the three participants (A510), (B520), and (C530).

[0039]

Figure 14 shows the processing flow of a case where the participant (A510) has operated the TV telephone icon (320) on the operation panel window (300) in a state where no

connection whatsoever has been established between two participants (A510) and (B520).

[0040]

✓ Step 1 (606): The operation 1 by the participant (A510) (602) and the operation 2 by the participant (B520) (604) are executed. The participant (A510) executes the operation 1 (602) by selecting the TV telephone icon (320) on the operation panel window (300) while the address book icon (340) is being concomitantly selected, by displaying the address book window (350), and by designating the participant (B520) from the address list. As a result, a telephone call is transmitted to the participant (B520). The participant (B520) executes the operation 2 (604) by picking up the receiver and by accepting the sound connection request from the participant (A[510]).

[0041]

✓ Step 2 (608): A state where the two participants are mutually connected via the sound system as a result of the aforementioned operation is shown.

[0042]

✓ Step 3 (610): A state where both the participants (A510) and (B520) have come to assume communications path standby statuses is shown. The participant (A510) retains the address for the participant (B520) upon the designation of the participant (B520) in correspondence to the operation panel window (300).

[0043]

Step 4 (612): A state where the video image system has been connected from the participant (A510) to the participant (B520) based on the address retained above is shown. The connection action based on the function of the TV telephone icon (320) is completed upon the connections of the sound system and video image system.

[0044]

Figure 15 shows a processing flow during a transition to a conference upon the connection of the sound system from a state where the two participants (A510) and (B[520]) are utterly unconnected.

[0045]

Step 1 (626): The participant (A510) executes the operation 1 (620) by selecting the telephone icon (310) on the operation panel window (300) while the address book icon (340) is being concomitantly selected and displayed on the address book window (350) and by designating the participant (B[520]) from the address list. As a result, a telephone call to the participant (B520) becomes transmitted. The participant (B520) executes the operation 2 (604) by picking up the receiver and by accepting the sound connection request from the participant (A[510]).

[0046]

Step 2 (628): A state where the sound [system] has been connected between the two participants as a result of the

aforementioned operation is shown.

[0047]

Step 3 (630): Both the participants (A510) and (B520) come to assume communications path standby statuses. The participant (A510) retains the address of the participant (B520) based on the designation of said participant (B520).

[0048]

Step 4 (632): The participant (A510) executes the operation 3 (624) by selecting the conference icon (330) on the operation panel window (300). The function of the conference icon (330) at this stage is determined with reference to the icon functional status table (500). Since the sound system has already been connected at step 1 (626), the conference icon (330) can be functionally characterized as follows: Sound: "OFF"; video image: "ON"; data: "ON."

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[0049]

Step 5 (634): The participant (A510) transmits a video image connection request and a data connection request addressed to the participant (B520) based on the address of the participant (B520) retained at step 3. The connection request confirmation window (430) shown in Figure 6 is concomitantly displayed on the work station screen (20) of the participant (B520).

[0050]

Step 6 (636): In a case where the participant (B520) inputs "YES" into the window (430), the video image connection



/request and data connection request from the aforementioned participant (A510) are accepted. As a result, communications paths of the data and video image system are established between the two participants in addition to the previously established sound system.

[0051]

In a case where the video image system (560) becomes connected, the TV telephone window (380) comes to be displayed on the work station screen (20) by initializing a program which controls the TV telephone window (380) or by executing a new routine, whereas in a case where the data system becomes connected, the conference room window (390) comes to be displayed on the work station screen (20) by initializing a program which controls the conference room window (390) or by executing a new routine. As a result, a joint operation which utilizes sounds exchanged through the telephone line, video images exchanged through TV telephone systems, and AP output data displayed on the conference room window (390) becomes possible for the two participants.

[0052]

Figure 16 shows a processing flow during a transition from a state where a conference is being convened between the two participants (A) and (B) (while they are being connected via the sound system, data system, and the video image system) to a state where a three-member conference is convened by adding the participant (C).

[0053]

Step 1 (646): The participant (A510) and participant (B520) are already connected via the sound system, data system, and the video image system.

[0054]

Step 2 (648): The participant (A510) executes the operation 1 (640) by selecting the TV telephone icon (320) on the operation panel window (300), and after the address book window (350) has been displayed by selecting the address book icon (340), the participant (C[530]) is designated from the address list. As a result, a telephone call is transmitted to the participant (C530).

[0055]

Step 3 (650): The participant (C530) executes the operation 2 (642) by picking up the receiver and by accepting the sound connection request from the member (A[510]). The participant (A510) comes to retain the address of the participant (C530) at the aforementioned step where the participant (C530) has been designated.

[0056]

Step 4 (652): The three participants (A), (B), and (C) become mutually connected via the sound system as a result of the aforementioned operations of 1 and 2.

[0057]

Step 5 (654): As soon as the aforementioned sound system connection has been established, the participant (C530) comes

to assume a communications path standby status in preparation for connections via other communications media.

[0058]

Step 6 (656): The participant (A510) executes the operation 3 (644) by selecting the conference icon (330) on the operation panel window (300) and by selecting the participant (C[530]) via the participant button (360). The icon functional status table (500-C), which corresponds to the participant (C530), is already connected to the sound system at this stage, and therefore, the conference icon (330) is functionally characterized by "ON" statuses with regard to the video image and data among the communications media. That the conference icon (330) is executed in relation to the participant (C530) at this stage therefore signifies the connections of the video image system and data system.

[0059]

[S]tep 7 (658): The participant (A510) severs the communications paths of the video image system and data system toward the participant (B520). The participant (B520), the communications paths of the video image system and data system to which have been thus severed, assumes a communications path standby status in preparation for re-connections of these communications paths.

[0060]

Step 8 (660): The participant (A510) submits a video image system and data system communications path connection

request to the participant (C530).

[0061]

Step 9 (662): The participant (C530) inputs "YES" on the connection request confirmation window (430). As a result, the data system and video image system communications paths from the participant (510A) to the participant (C530) become connected.

[0062]

Step 10 (664): The participant (A510) issues a command for connecting the video image system and data system communications paths vis-a-vis the participant (B520) to the participant (C530) together with the address of the participant (B520).

[0063]

Step 11 (668): The participant (C530) retains the aforementioned address of the participant (B520).

[0064]

Step 12 (670): The participant (C530) establishes video image system and data system communications paths with the participant (B520) based on the address of the participant (B520), which has been notified by the participant (A510).

[0065]

It is thus that a routine for connecting the communications paths of the sound system, data system, and the video image system in a cyclic fashion among the three conference participants becomes completed.

[0066]

Figure 17 is a flow chart pertaining to the routine of the program (680), which executes the multi-media communications connection of the present invention.

[0067]

The communications system which is initially connected by the present program (680) is a telephone-based sound communications path (step 682). Upon the connection of the sound communications path, it is judged whether or not the respective communications paths of the other communications media are characterized by standard statuses (step 684). In a case where [any of] said communications paths fail[s] to be characterized by a standby state, the prevailing status is permutated into a communications path standby status (step 686), whereas in a case where said communications path is characterized by a standby status, an advancement is made directly to the next step 688 directly, where an input standby status is assumed.

/8

[0068]

Concrete examples of inputs awaited at step 688 include a user's input into the operation panel window (300) and a connection request received from another site. Upon the detection of any input, it is judged whether or not said input represents the severance of the sound (step 690). The sound severance occurs as a result of the replacement of the telephone receiver, and in a case where a user replaces the

receiver, the communications path for the sound system becomes instantly severed. Upon the severance of the sound, it is first judged whether or not connections are being perpetuated with the other communications media (data system and video image system) (step 692), and in a case where the connection with any of these communications media is acknowledged, requests for severing its communications path are transmitted to other participants (step 694) while the communications path(s) which is still being connected is being severed (step 696), as a result of which the routine is completed (step 698). In a case where none of the communications paths other than that for the sound system have been judged to be connected at step 692, the routine is completed at this stage (step 698). In a case where the input is judged to be other than the severance of the sound at step 690, furthermore, the input routine explained below (step 700) is executed.

[0069]

Figure 18 is a flow chart which shows the input routine (700) in detail. In the following, the contents of the aforementioned input routine will be explained with reference to an example of operation panel window (300) shown in Figure 4, on which multiple participants are simultaneously displayed.

[0070]

First, it is judged whether or not the prevailing input concerns an icon selection on the operation panel window

(300) (step 702). In a case where it is judged to be other than the input into the operation panel window (300), it is judged whether or not it is a connection request from another site (step 734). In a case where it has been judged to be a connection request from another site, the connection request confirmation window (430) is displayed on the work station screen (20) (step 736), and it is judged whether or not "YES" has been inputted into this window by the user (step 738). In a case where the input of "YES" has been acknowledged, the communications path which is the object of the connection request is connected (step 740), and subsequently, the contents of the icon functional status table (500) are renewed (step 744). In a case where the input of "NO" has been acknowledged at the judgment step 738, the routine is completed at this stage. In a case where the prevailing input is judged to be other than a connection request from another site at the judgment step 734, furthermore, a processing routine corresponding to said input is executed (step 742).  
[0071]

In a case where the input has been judged to be destined to the operation panel window (300) at the judgment step 702, it is checked whether or not the number of participants who have been previously connected via communications paths is 3 or larger. The number of participants is memorized into this program as a variable (e.g., N), and whenever a new participant joins the joint operation, 1 each is added to the

prevailing variable N. A case where the number of participants is assumed to be 2 will be explained below.

[0072]

That the number of participants is 2 means that there is only one other conference participant, and therefore, there is no need to designate the participant button (360) on the operation panel window (300). In other words, the address which is being retained in correspondence to the operation panel window (300) inevitably belongs to the only other conference participant, and in a case where the telephone icon (310), TV telephone icon (320), or conference icon (330) is selected on this operation panel window (300), the address of the other participant is monolithically determined. In this example, therefore, the address of the other participant is obtained after an advancement has been made to step 720 from the judgment step 704.

[0073]

Next, the icon functional status table (500) corresponding to the aforementioned participant is referred to (step 722), followed by the acquisition of a function corresponding to the selection media icons defined in said table (step 724) and then by the execution of said function (step 726). Next, a connection request is transmitted to a site which serves as a connection node (step 728), and in a case where "YES" has been obtained from the other party in response to the aforementioned connection request, the



connection routine is completed (step 732), and after the function designation status of the icon functional status table (500) corresponding to the connection node has been updated (step 744), this routine is power-corrected [sic: Presumably "completed?"]. In a case where "NO" is obtained as a response at step 730, this routine is completed without establishing a connection.

[0074]

In a case where the number of participants has been judged to be 3 or larger at the judgment step 704, it is judged whether or not the participant button has been pressed on the operation panel window (300) (step 706). In a case where said participant button has been pressed, a participant address corresponding to the aforementioned participant button is obtained (step 718), and a connection with the other party is attempted through the aforementioned routine from step 722 to step 744.

[0075]

In a case where the participant button (360) has been judged to have not been pressed at the judgment step 706, the following routine is executed. That the participant button (360) has not been pressed after the selection of a media icon (telephone icon (310), TV telephone icon (320), or conference icon (330)) means that no call has been placed to the new participant. In this case, therefore, the selection of the address book icon (340) is awaited (step 708), and in a case

where the address book icon (340) has been selected, the address book window (350) is displayed on the work station screen (20) (step 710). Next, the input of the address of the other party is awaited (step 712), and in a case where the input of the selection of the address of the other party has been acknowledged, the address of the other party is obtained and retained (step 714). Upon the completion of this stage, the routine corresponding to steps 722 and beyond is executed, and a communications path connection with the other site is attempted.

[0076]

(Effects of the invention)

As the foregoing explanations have clearly demonstrated, as far as the multi-media terminal and multi-media communications connection control format of the present invention are concerned, communications connection control icons are endowed with dynamically variable functions, and therefore, operations for redesignating communications media connection statuses can be simplified by invoking different functions from an identical icon. After the reception side has picked up the telephone receiver, furthermore, the objective communications environment can be established easily based on operations on the transmission side alone.

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#### Brief explanation of the figures

Figure 1: A diagram which shows the overall constitution of a conference system to which the present invention can be

applied.

Figure 2: A diagram which shows the hardware constitution of a terminal device (work station) which constitutes [said] conference system.

Figure 3: A diagram which shows one example of the operation panel window (300) of the present invention to be displayed on a work station screen.

Figure 4: A diagram which shows one example of the operation panel window (300) in a case where multiple participants are involved.

Figure 5: A diagram which shows one example of the participant-specific operation panel windows (410) which represents a variation of the aforementioned operation panel window (300).

Figure 6: A diagram which shows one example of the connection request confirmation window (430) which is displayed on the work station screen.

Figure 7: A diagram which shows one example of the icon functional status table (500) which the multi-media communications connection program (680) possesses.

Figure 8: A diagram which shows the variation of the functional status of the icon functional status table as a result of an icon operation.

Figure 9: A diagram which shows a state where two conference participants have become mutually connected via a sound system logic communications path.

Figure 10: A diagram which shows a state where the logic communications paths of data and video image systems are additionally connected in the aforementioned state of Figure 9.

Figure 11: A diagram which shows a state where a sound system logic communications path has become established in a case where a third participant has joined a conference between two participants.

Figure 12: A diagram which shows a process for establishing the communications paths for the data and video image systems in the state of Figure 11.

Figure 13: A diagram which shows a state where sound system, data system, and video image system logic communications paths have become connected among three participants in a cyclic fashion.

Figure 14: A demonstrational diagram pertaining to a case where the participant (A) has operated the TV telephone icon (320) in a state where no connection is being established between two participants.

Figure 15: A demonstrational diagram pertaining to a process for connecting the video image system and data system by operating the conference icon (330) in a state where the two participants are mutually connected via a sound circuit.

Figure 16: A demonstrational diagram pertaining to the flow of a process whereby a transition is made from a two-member conference to a three-member conference.

Figure 17: A flow chart which shows the program (680) for the multi-media communications connection of the present invention.

Figure 18: A flow chart which shows the input routine (700) of Figure 17 in detail.

(Explanation of notations)

(10): Telephone machine; (20): Work station; (30): Network; (50): Telephone switchboard network; (60): Individual utility window; (70): Joint utility window; (130): Output device; (180): Input device; (190): Window system; (300): Operation panel window; (310): Telephone icon; (320): TV telephone icon; (330): Conference icon; (340): Address book icon; (350): Address book window; (360): Participant button; (370): Display area; (380): TV telephone window; (390): Conference room window; (400): Data icon; (410): Participant-specific operation panel windows; (420): Individual operation window; (430): Connection request confirmation window; (440): Connection confirmation message; (500): Icon functional status table; (502): Communications media; (504): Media icon names; (540): Sound system; (550): Data system; (560): Video image system; (680): Multi-media communications connection program; (700): Input routine for the multi-media communications connection program.

#### Keys to the Figures

##### Figure 3

[(A): Telephone; (B): TV telephone; (C): Conference; (D):

Address book; (E): Kobayashi; (F): Shimazaki; (G): Tamiya;  
(H): Akutagawa]

Figure 4

[(A): Telephone; (B): TV telephone; (C): Conference; (D):  
Address book; (E): Shimazaki; (F): Kobayashi; (G): Data/video  
image/sound; (H): Data/sound; (I): Conference room; (J): Datum  
1; (K): Datum 2]

Figure 1

[(10-A), (10-B), and (10-C): Telephone machines; (20-A), (20-  
C), and (40-B): Work station screens; (30): LAN or ISDN]

Figure 5

[(A): Shimazaki; (B): Telephone; (C): TV; (D): Conference;  
(E): Kobayashi; (F): Telephone; (G): TV telephone; (H):  
Sound/data; (I): Conference; (J): Master; (K): Conference  
room; (L): Datum 1; (M): Datum 2; (N): Individual operation;  
(O): Shimazaki; (P): Data; (Q): Figure; (R): Memo; (S):  
Address book]

Figure 6

[(A): Individual operation; (B): Data; (C): Figure; (D): Memo;  
(E): Statistical chart; (F): Connect to conference room?]

Figure 7

[(A): Telephone; (B): TV telephone; (C): Conference; (D):  
Sound; (E): Video image; (F): Data; (502): Communications  
media; (504): Icon names]

Figure 10

[(540): Sound system; (550): Data system; (560): Video image

system]

Figure 2

[(10): Telephone machine; (30): To LAN or ISDN; (80): Communications interface; (110): Frame memory; (120): Display controller; (130): Display; (140): Memory device; (150-A) and (150-B): Registers; (160): Keyboard driver; (170): Mouse driver; (180-A): Keyboard; (180-B): Mouse]

Figure 13

[(540): Sound system; (550): Data system; (560): Video image system]

Figure 8

[(A): Telephone; (B): TV telephone; (C): Conference; (D): Sound; (E): Video image; (F): Data; (502'): Communications media; (504'): Icon names]

Figure 9

[(540): Sound system; (X): Video image system and data system connection standby status]

Figure 11

[(540): Sound system; (550): Data system; (560): Video image system; (X): Video image system and data system connection standby status]

Figure 12

[(540): Sound system; (550): Data system; (560): Video image system; (X): Video image system and data system connection standby status]

Figure 14

[(X): Sound connection; (Y): Address B; (Z): Video image connection; (602): Operation 1; (604): Operation 2; (606): Step 1; (608): Step 2; (610): Step 3; (612): Step 4]

Figure 15

[(A): Sound connection; (B): Address B; (C): Video image connection request; (D): Data connection request; (E): Video image connection; (F): Data connection; (620): Operation 1; (622): Operation 2; (624): Operation 3; (626): Step 1; (628): Step 2; (630): Step 3; (632): Step 4; (634): Step 5; (636): Step 6]

Figure 16

[(1): Address B; (2): Address C; (3): Data connection; (4): Data connection request; (5): Sound connection; (6): Video image connection; (7): Video image connection request; (640): Operation 1; (642): Operation 2; (644): Operation 3; (646): Step 1; (648): Step 2; (650): Step 3; (652): Step 4; (654): Step 5; (656): Step 6; (658): Step 7; (660): Step 8; (662): Step 9; (664): Step 10; (668): Step 11; (670): Step 12]

Figure 17

[(680): Start; (682): Sound connection; (684): Communications path standby status?; (686): Assumption of communications path standby status; (688): Input standby; (690): Sound severed?; (692): Communications path in connection?; (694): Telephone path severance request transmission; (696): Communications path severance; (698): Complete; (700): Input routine; (E):

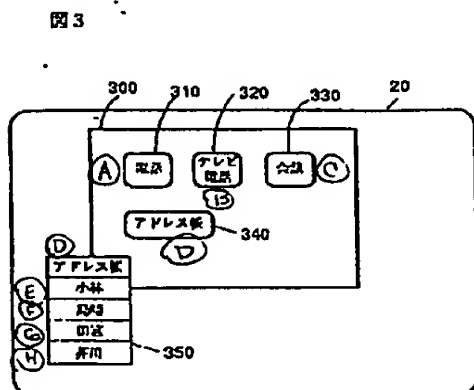


End]

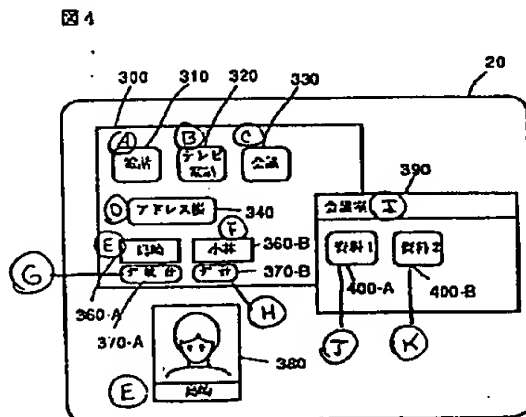
Figure 18

[(700): Input routine entry; (702): Icon input?; (704): Number of participants  $\geq 3$ ?; (706): Participant button pressed?; (708): Address book selected?; (710): Address book display; (712): Address book selected?; (714): Acquisition of the address of the other party; (718): Acquisition of the address of the other party; (720): Acquisition of the address of the other party; (722): Reference to icon functional status table; (724): Acquisition of icon function; (726): Execution of the function; (728): Connection request transmission; (730): Reception of "YES"; (732): Connection complete; (734): Reception of connection request from the other site?; (736): Display of connection request confirmation window; (738): "YES" or otherwise?; (740): Connection complete; (742): Other; (744): Renewal of the icon functional status table]

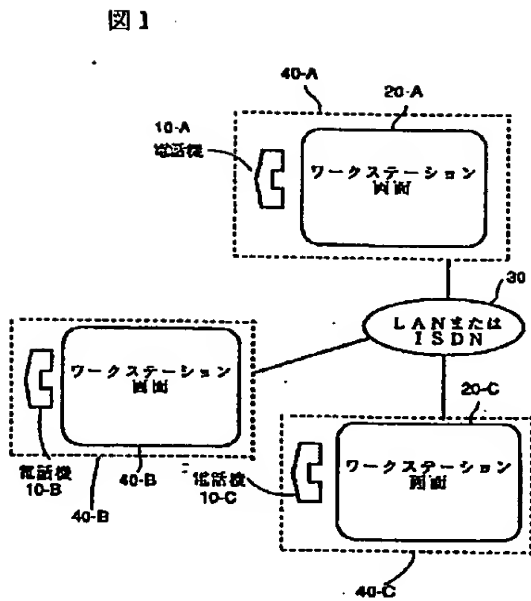
【図3】



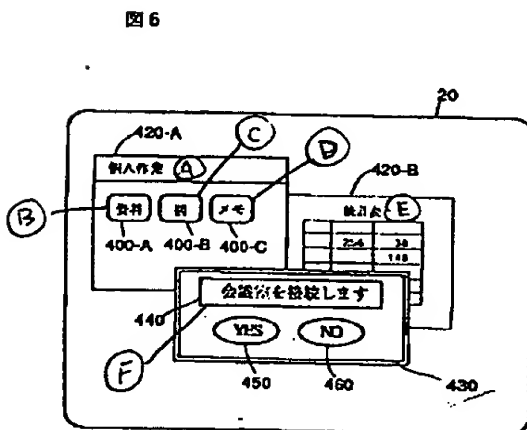
【図4】



【図1】

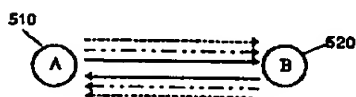


【図6】



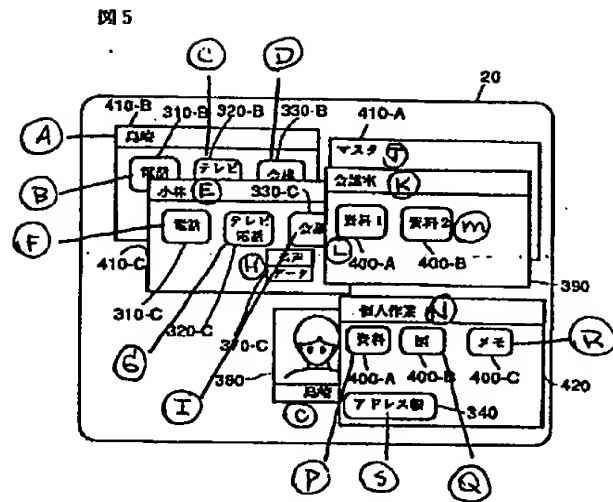
【図10】

図10



— 540:音声系  
 - - - 550:データ系  
 - · - 560:映像系

【図5】



【図7】

図7

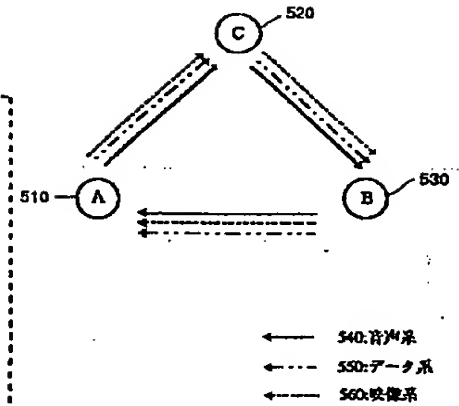
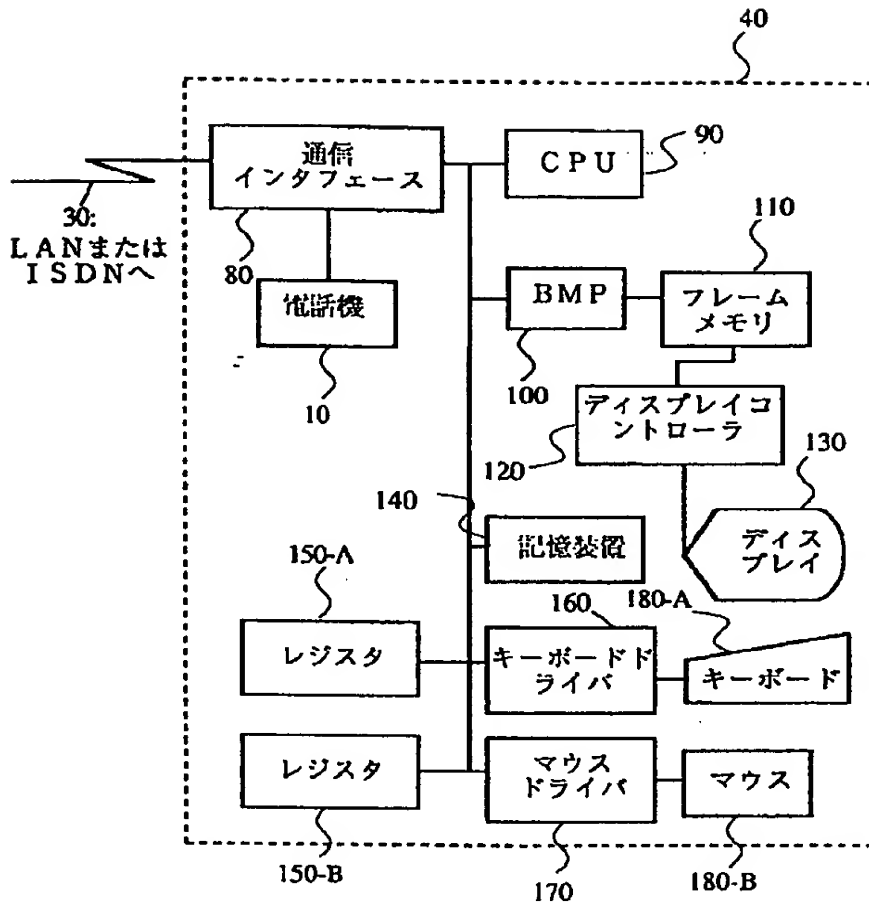
500			
502			
504			
通信メディア	音声	映像	データ
アイコン名			
A 電話	ON	OFF	OFF
B テレビ電話	ON	ON	OFF
C 会議	ON	ON	ON

【図2】

【図13】

図 2

図 13



【図8】

【図9】

図 8

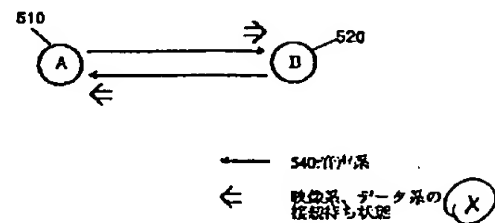
図 9

500'

502'

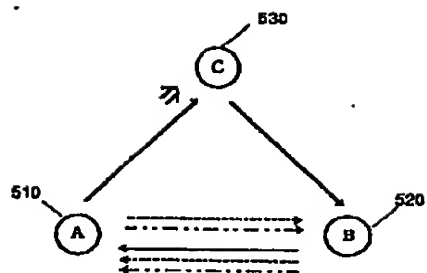
504'

通信メディア アイコン名	(D) 音声	(E) 映像	(F) データ
(A) 電話	OFF	OFF	OFF
(B) テレビ電話	OFF	ON	OFF
(C) 会議	OFF	ON	ON



【図11】

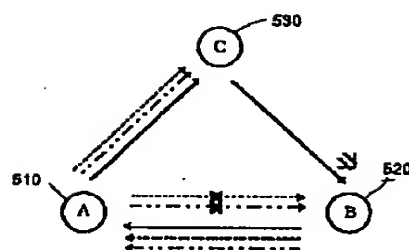
図11



← 540:音声系  
 ← --- 550:データ系  
 ← ..... 560:映像系  
 ⇐ 映像系、データ系の接続待ち状態 (X)

【図12】

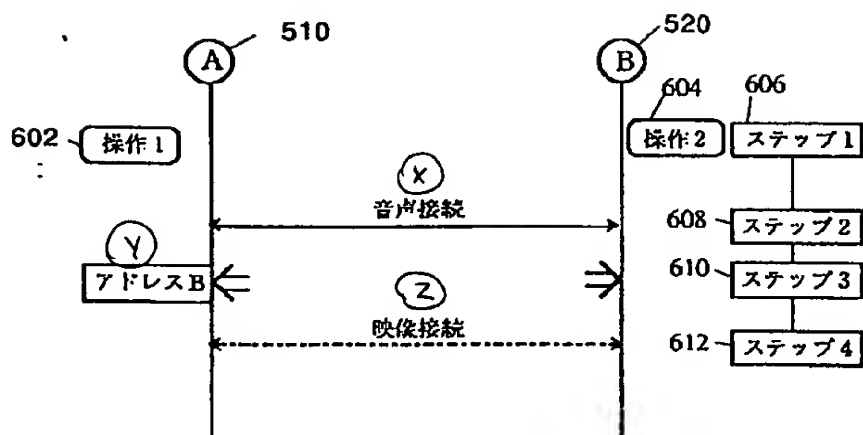
図12



← 540:音声系  
 ← --- 550:データ系  
 ← ..... 560:映像系  
 ⇐ 映像系、データ系の接続待ち状態 (X)

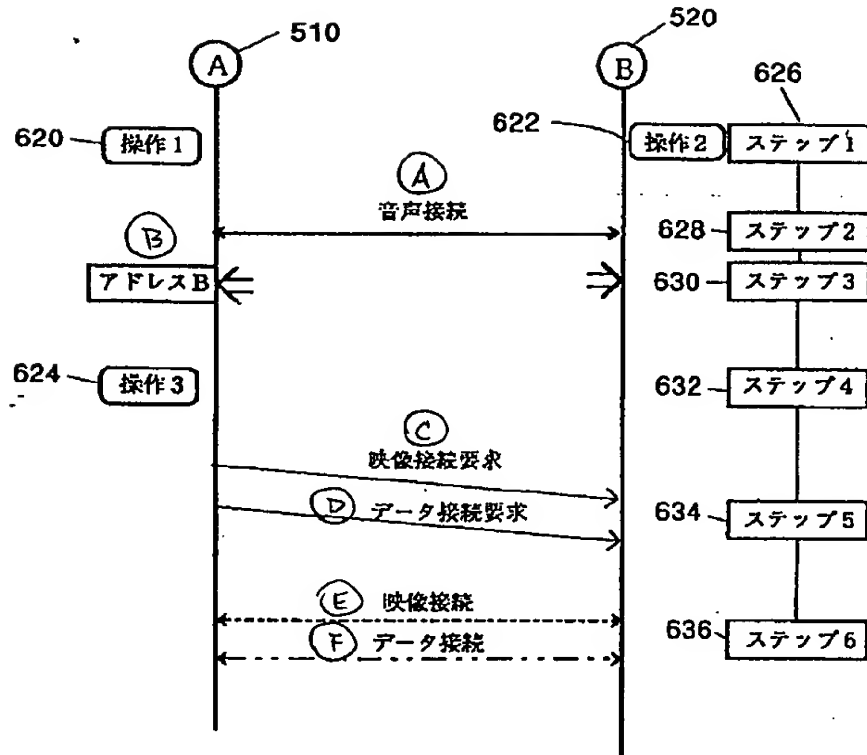
【図14】

図14



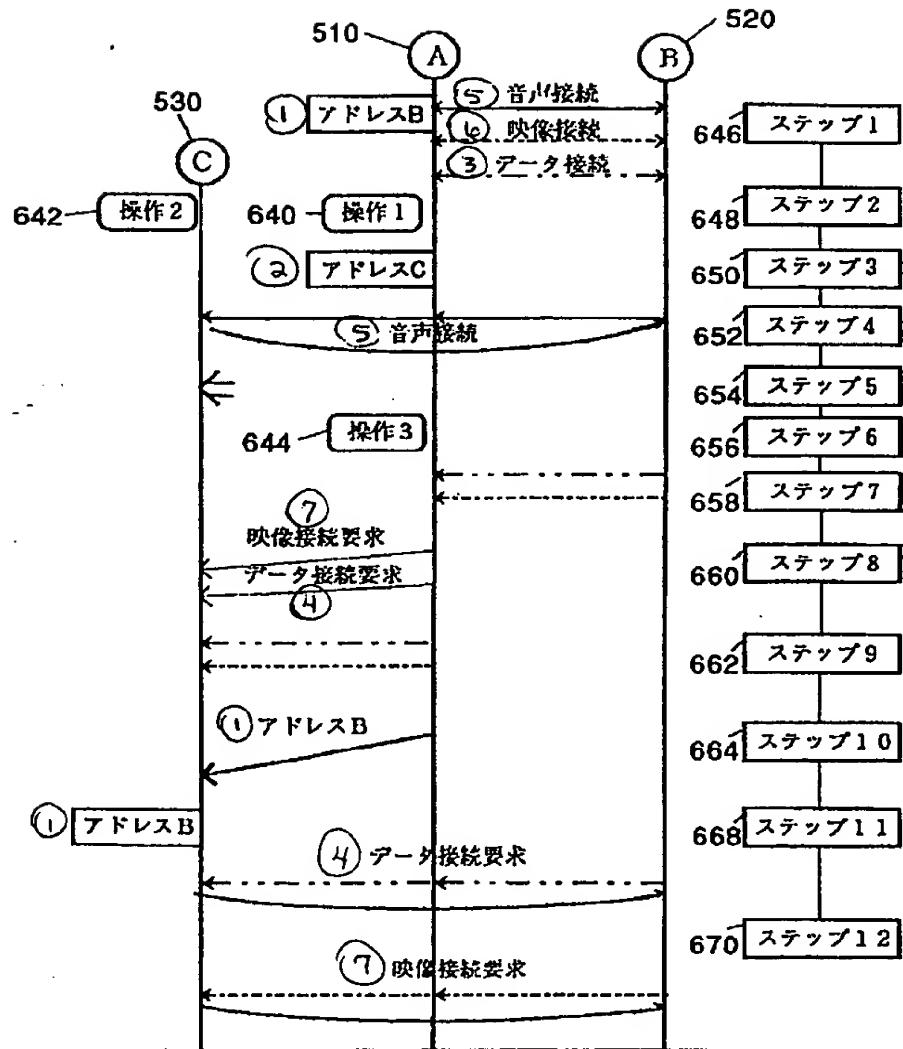
【図15】

図15



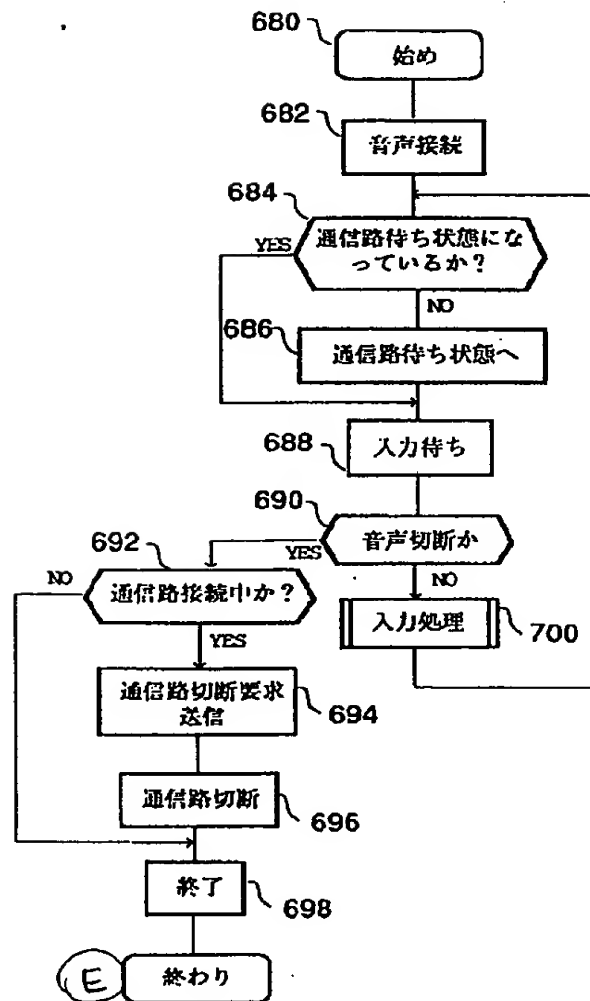
【図16】

図16



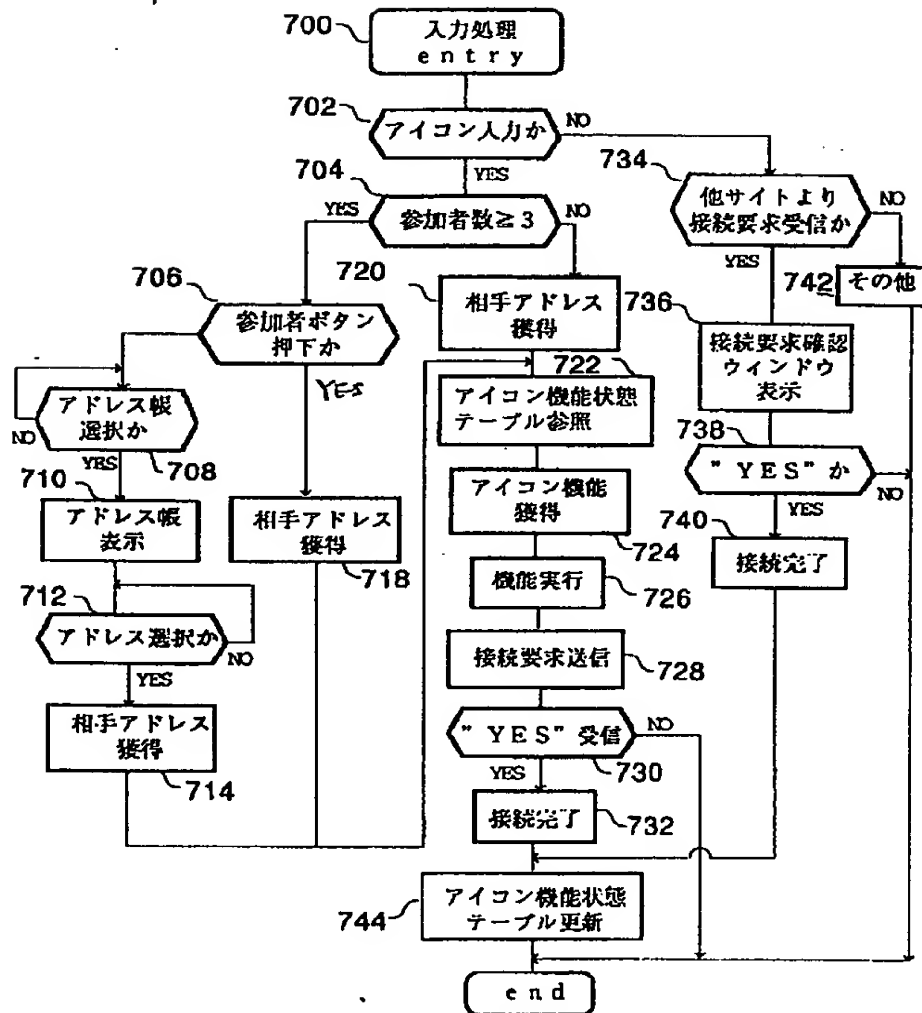
【図17】

図17



【図18】

図18



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